

ocean. The following summary of extracts from the logs of ocean steamers on 46 voyages between the United States and Europe, (as given in the *N. Y. Maritime Register*,) during the month will serve to illustrate the unusually fine weather prevailing. Out of an aggregate of 345 daily reports, "rain squalls" were reported in 6 cases, "squally weather" in 7 cases and "moderate gale," the highest wind recorded, in only 3 cases. Of these 16 cases, 11 occurred to the east or west, respectively, of the meridians of 17° and 47° W and attended the low areas shown on chart. The other 5 cases, which included two of the "moderate gales," occurred after the 22nd and attended areas Nos. VIII and IX. Out of an aggregate of about 176 daily simultaneous observations taken on 22 voyages between the two continents and reported directly to this Office, only 6 cases were reported of winds over force 6 on Beaufort scale. Three of these were moderate to fresh SW'ly gales experienced in connection with area No. IV on the 11th and 12th, and reported by steamers *Indiana* and *Braunschweig*, and the other three, northwesterly moderate to strong gales in connection with areas Nos. VIII and IX, reported by steamers *Indiana* and *Scythia* on the 28th, 30th and 31st. The following storms of limited extent were reported along the American coast: From the 7th to the 11th, bark *Teigtut* experienced a southerly gale, with heavy squalls, along the southwest coast of Greenland. On the midnight of the 9th, ship *Jumna*, at Sydney, C. B., experienced a very heavy storm of wind and rain, and heavy thunder and lightning, lasting 2 hours, and on the 17th, schooner *Addie Fuller*, in $33^{\circ} 40' N.$ $78^{\circ} 40' W.$, had a severe thunder-storm which lasted about two hours—rainfall in about 1 hour and 45 minutes, 1.97 inch; the wind blew in fearful gusts from NW., and the disturbance seemed to move from WNW. toward SSE. On July 28th, steamer *Scythia*, in $39^{\circ} 47' N.$ $68^{\circ} 18' W.$, passed a well-defined waterspout within half a mile of the vessel, traveling rapidly to ENE.; weather at the time overcast and gloomy, with heavy rolling swell from the SSE.

Upon chart No. V are shown for the month of *December* 1878, the mean pressure, mean temperature, mean force and prevailing direction of winds at 7:35 a. m. Washington mean time, (10:43 p. m. Greenwich mean time) for the northern hemisphere, and at certain detached stations in the southern hemisphere. High pressures (30.20 in. or 767.1 mm. and above) covered in Asia, the greater part of Siberia and in America, a wide belt of country, extending from the Gulf of Mexico to the Oregon coast. Low pressures (29.80 or 756.9 and below) covered all of northern Europe, and in America, an area about 10 degrees wide, extended from the Canadian Maritime Provinces southeastward over the Atlantic ocean to about 30° W. The lowest isobar, 29.60 or 751.8 included Denmark, the North sea, Southern Sweden and the extreme eastern coast of Norway. The lowest pressure, 29.39 or 746.5, prevailed at St. Paul's Island, Behring's sea, and the highest 30.59 or 777.0 at Yeniseisk. The highest barometric reading noticed was 31.26 at Yeniseisk, Siberia, December 23rd, 1878, and the lowest 28.03 at St. Paul's Island on December 31, 1878, showing a range of 3.23 inches for the northern hemisphere. As compared with the chart of mean pressure for December 1877, the barometric conditions present little if anything in common. In 1877, the high pressure in Siberia was much further eastward, the area of comparative low pressure in the interior of the United States had (in 1878) given place to an area of high pressure, and the area of lowest pressure then over Iceland had withdrawn southward and given place to a mean at Stykkisholm of 30.10 as against 29.25. Over the Azores the high mean pressures were replaced by a pressure averaging 0.50 lower. A remarkable range of mean pressures in the northern hemisphere is shown for December, 1878, being 1.20 inch—from 29.39 at St. Paul's Island to 30.59 at Yeniseisk. As compared with the mean pressure for November, 1878, the following are the greatest changes: St. Michael's, +0.47; Yeniseisk, +0.23; St. Paul's Island, +0.22; Ekaterinburg, +0.21; Barnaul, +0.20; North Atlantic ocean between 40° and 50° N., 30° and 40° W. —0.37; Kertch, —0.31; Angra, —0.24; Ponta Delgada, —0.23; Moscow, —0.22; Sandwick and Constantinople, —0.20; Valentia and Tokio, —0.19. The regions of highest pressure and lowest temperature are nearly coincident over Siberia. A remarkable feature of the temperature in December is the unusually high temperature in Greenland, $31^{\circ}.0$ at Godthaab, and northeastern coast of America, where nearly the same temperature prevailed as in the preceding month; at Godthaab on December 6th, the unusually high temperature of 56° is noticed. In general *southwesterly* winds prevailed in Europe and Algeria; *northwesterly* winds in America (except on the Pacific coast, where they were *northeasterly*), and the Atlantic ocean W. of longitude 40° W. Over the rest of the Atlantic, the winds were *southwesterly* S. of latitude 40° , and *northeasterly* north of that parallel and in the British Isles. The predominating winds in Asia, where calms did not prevail, were, *northwesterly* in India, *southeasterly* in Siberia, and *northeasterly* along the entire eastern coast.

On chart No. VI are traced the paths of twenty-six of the principal storm-areas of the Northern Hemisphere for the month of *December*, 1878. The recurring of the paths of storms noticed in the REVIEW of last month, as occurring in the storms of November, 1878, is strongly marked in those of December in areas II, VIII and XXI. The southerly positions of the paths over the eastern portion of the United States, the Atlantic ocean and Europe, the rapid progressive motion of storms along the Atlantic coast of the American continent, and their retarded progress over the central and eastern portions of the Atlantic ocean are marked features.

TEMPERATURE OF THE AIR.

The mean temperatures for August, 1880, are shown by isotherms on chart No. II. The table of average temperatures on that chart shows a deficiency of temperature for the entire country, except

Tennessee, the Ohio, Upper Mississippi and Lower Missouri valleys, from which sections slight excesses, not exceeding 1° , were reported. Deficiencies exceeding 1° are as follows: Pacific coast, about 2° ; Plateau districts, from 2° to 3° ; St. Lawrence valley, 2° ; Upper Missouri valley, 4° ; and Rio Grande valley, 6° .

The following list shows the maximum and minimum temperatures in each State and Territory:

Maximum and Minimum Temperatures.—Upon charting the maximum temperatures for the month, it is found that such temperatures (except along the immediate Pacific, Middle Atlantic and southern New England coasts and the northern half of the Lake region,) range from 90° to 99° . Maximum temperatures exceeding 100° are reported from all of southern Arizona and from the following scattered stations: Corsicana and Ft. Keogh, 100° ; Denison, Rio Grande City, Bismarek and St. Louis, 101° ; Umatilla and Edinburg, 102° ; Red Bluff and Visalia, 103° ; the highest temperatures were Yuma and Burkes, 111° , Florence, 112° ; and the lowest Wood's Holl and Pembina, 80° and San Francisco, 73° . The isotherm of 60° of minimum temperatures leaves to the southward Virginia, Tennessee, the South Atlantic and Gulf States, except the northern half of Texas. East of the Mississippi river the isotherm of 50° passes through Massachusetts and the southern stations of the Lake region. Minimum temperatures of 70° or above were reported from every station on the immediate Gulf coast, except Galveston 67° . The highest minimum temperatures were: Key West and Edinburg, 76° , New Orleans, 71° ; and the lowest, except at elevated stations, Campo, 31° , Marquette, 39° , Burlington, Vt., and Pembina, 40° .

Maximum Temperatures.—*Alabama*: 96° at Mobile and 97° at Montgomery. *Arizona*: 92° at Prescott, 111° at Burkes and Yuma and 112° at Florence. *Arkansas*: 92° at Little Rock and 93° at *Mount Ida. *California*: 73° at San Francisco, 102° at *Princeton and Campo. *Colorado*: 62° at *Summit and 93° at Denver. *Connecticut*: 88° at New Haven. **Southington* and **Mystic*. *Dakota*: 92° at Fort Buford and 101° at Bismarek. *District of Columbia*: 95° at Washington. *Delaware*: 90° at *Dover. *Florida*: 91° at Punta Rassa, 96° at Jacksonville and 101° at *Gulf Hammock. *Georgia*: 96° at Augusta and 99° at *Forsyth. *Iowa*: 100° at Keokuk, 102° at *Muscatine and *Glenwood and 104° at *Boonesboro. *Idaho*: 97° at Boise City. *Illinois*: 97° at Springfield, 100° at *Peoria and *Mount Sterling. *Indiana*: 94° at Indianapolis and 100° at Logansport. *Indian Territory*: 99° at Fort Gibson. *Kansas*: 98° at Leavenworth, 103° at *Topeka and 104° at *Fort Leavenworth. *Kentucky*: 94° at Louisville. *Louisiana*: 94° at Shreveport and 103° at *Point Pleasant. *Maine*: 92° at Portland. *Maryland*: 91° at Baltimore and 93° at *Emmitsburg. *Massachusetts*: 96° at Boston. *Michigan*: 89° at Port Huron and 93° at *Lansing. *Minnesota*: 98° at St. Paul. *Mississippi*: 98° at Vicksburg. *Missouri*: 101° at St. Louis and 103° at *Booneville. *Montana*: 97° at Fort Benton. *Nebraska*: 97° at North Platte and 104° at *Mount Howard. *Nevada*: 95° at Winnemucca and 98° at *Carson City. *New Hampshire*: 66° on Mount Washington and 98° at *Auburn. *New Jersey*: 90° at Sandy Hook and 97° at *Dodge Mine. *New Mexico*: 100° at La Mesilla. *New York*: 93° at Oswego, *Waterburgh and *Plattsburg Barracks. *North Carolina*: 94° at Smithville, 95° at *Weldon and *Statesville. *Ohio*: 92° at Cincinnati and 95° at *College Hill. *Oregon*: 102° at Umatilla. *Pennsylvania*: 98° at Pittsburgh. *Rhode Island*: 84° at Newport and 95° at *Fort Adams. *South Carolina*: 93° at Charleston. *Tennessee*: 95° at Memphis and Nashville. *Texas*: 102° at Edinburg, 101° at Denison, 100° at Corsicana, *Clarks-ville and *Melissa. *Utah*: 94° at Salt Lake City. *Vermont*: 88° at Burlington and 100° at *Char-lotte. *Virginia*: 95° at Norfolk. *Washington Territory*: 83° at Olympia. *West Virginia*: 88° at *Helvetia. *Wisconsin*: 92° at Madison and 97° at *Beloit. *Wyoming*: 94.5° at Cheyenne.

Those marked with a star (*) are reported by U. S. Army Post Surgeons or Voluntary Observers.

Minimum Temperatures.—*Alabama*: 70° at Mobile, Montgomery and Pensacola. *Arizona*: 40° at Prescott and 51° at Camp Verde. *Arkansas*: 60° at Little Rock and 45° at *Mount Ida. *California*: 31° at Campo and 49° at Sacramento. *Colorado*: 50° at Denver, 41° at *Hermosa, 29° at *Summit and 22° on Pikes Peak. *Connecticut*: 46° at New Haven. *Dakota*: 41° at Fort Buford and Deadwood. *Delaware*: 62° at Delaware Breakwater and *Dover. *District of Columbia*: 59° at Washington. *Florida*: 70° at Cedar Keys, Jacksonville, Punta Rassa, Pensacola and *Fort Barran-cas. *Georgia*: 64° at Atlanta and 63° at *McPherson Barracks. *Iowa*: 41° at Davenport. *Idaho*: 42° at Boise City. *Illinois*: 53° at Chicago and 45° at *Riley. *Indiana*: 51° at Indianapolis, 37° at *New Corydon and 46° at *Spiceland. *Indian Territory*: 52° at Fort Gibson. *Kansas*: 50° at Dodge City and 46° at *Manhattan. *Kentucky*: 56° at Louisville. *Louisiana*: 58° at Shreveport. *Maine*: 45° at Eastport and 38° at *Orono. *Maryland*: 61° at Baltimore, 55° at *Woodstock and *Emmitsburg. *Massachusetts*: 45° at Springfield and 36° at *Westborough. *Michigan*: 39° at Marquette. *Minnesota*: 41° at Breckenridge. *Mississippi*: 65° at Vicksburg and near *Fayette. *Missouri*: 55° at St. Louis and 50° at *Neosho. *Montana*: 31° at Virginia City. *Nebraska*: 51° at Omaha and 49° at *Austin. *Nevada*: 32° at Winnemucca and 31° at *Carson City. *New Hampshire*: 27° on Mount Washington and 32° at *Auburn. *New Jersey*: 55° at Barnegat, 46° at *Atco and *Deckertown. *New Mexico*: 45° at Silver City and Santa Fé. *New York*: 44° at Buffalo and 34° at *Schroon Lake. *North Carolina*: 59° at Charlotte, 46° at *Roan Mountain and 58° at *Ellsworth. *Ohio*: 48° at Cleveland and *Westerville. *Oregon*: 43° at Roseburg. *Pennsylvania*: 51° at Pitts-burg and 35° at *Dyberry. *Rhode Island*: 53° at Newport and 52° at *Fort Adams. *South Caro-lina*: 69° at Charleston. *Tennessee*: 59° at Memphis. *Texas*: 48° at Fort Elliott, 54° at Stockton

and 70° at Rio Grande City. *Utah*: 44° at Salt Lake City and 30° at *Coalville. *Vermont*: 40° at Burlington and 36° at *Woodstock. *Virginia*: 58° at Fort Whipple. *Washington Territory*: 41° at Olympia. *West Virginia*: 46° at *Helvetia. *Wisconsin*: 51° at Milwaukee and 46° at *Neillsville. *Wyoming*: 40° at Cheyenne.

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Ranges of Temperature at Signal Service Stations.—The monthly ranges will appear from the maxima and minima just given. The greatest daily ranges vary in New England, from 19° at Wood's Holl to 32° at Burlington; Middle Atlantic States, from 16° at Chincoteague to 27° at Albany; South Atlantic States, from 18° at Savannah to 24° at Wilmington and Jacksonville; Eastern Gulf States, from 20° at Pensacola to 25° at Montgomery; Western Gulf States, from 14° at Galveston to 28° at Vicksburg; Ohio valley and Tennessee, from 20° at Cairo to 37° at Pittsburgh; Lower Lake region, from 24° at Sandusky to 33° at Oswego; Upper Lake region, from 24° at Chicago to 34° at Marquette; Upper Mississippi valley, from 24° at Davenport to 31° at Des Moines, Dubuque and St. Paul; Missouri valley, from 26° at Omaha to 41° at Bismarck; Texas, from 24° at Laredo to 35° at Fort Elliott and 41° at El Paso; Red River of the North valley, from 32° at Pembina to 39° at Breckenridge; Northern Plateau District, from 39° at Lewiston to 46° at Ft. Shaw; Middle Plateau District, from 31° at Salt Lake City to 47° at Winnemucca; Southern Plateau District, from 32° at Santa Fe to 40° at Wickenburg; Rocky Mountain Stations, 20° at Pikes Peak, 37° at Denver, 39° at Virginia City and 41° at Cheyenne; California, from 18° at San Francisco to 42° at Visalia; Northern Pacific coast region, from 31° at Olympia to 43° at Umatilla.

Frost.—*California*: Lompoc, 18th; Campo, 30th and 31st, injuring vegetables. *Colorado*: Hermosa, 30th and 31st; Summit, frequent; Pikes Peak, 2nd, 7th, and frequent after 16th. *Connecticut*: New London, 16th, light in low lands near. *Idaho*: Boise City, 25th and 26th, in low places. *Maine*: Bangor, 25th and 26th; Portland, 27th, in suburbs of city. *Massachusetts*: Rowe, 16th; Springfield, 16th and 20th; Westborough, 16th and 27th; Boston, 16th, light in suburbs. *Michigan*: Thornville, 3rd, on low grounds. *New Hampshire*: Auburn and Contoocookville, 16th, on low grounds; Grafton, 12th and 26th; 16th, damaging corn in low places, "frost very general throughout State;" Mount Washington, 5th, 6th, 15th, frost feathers 3 to 6 inches long in exposed places; 10th to 23rd. *New Jersey*: Freehold, 16th, 5 miles SE. of station; Linden, 18th. *New York*: Ardenia, North Volney and near Penn Yan, 16th; Palermo, 16th, light; Cooperstown, Port Jervis and Nile, 16th and 17th, injuring corn, buckwheat and potatoes at latter place; Buffalo, 16th, on low grounds; Albany, 16th, on mountains near, damaging vegetables. *Nevada*: Carson City, 11th, 26th, 30th and 31st; Winnemucca, 31st. *Pennsylvania*: Blooming Grove, 16th, damaging buckwheat; Wellsboro, 16th; Dyberry, 16th and 17th, killing corn in places. *Utah*: Coalville, killing vegetables 28th. *Vermont*: Woodstock and Stafford, 16th and 26th; Lunenburg, 26th.

Ice.—*Colorado*: Summit, 3rd. *Montana*: Virginia City, 30th. *Nevada*: Winnemucca, 31st.

PRECIPITATION.

The general distribution of rain-fall, for August, 1880, is shown on chart No. III, as accurately as possible, from about 500 reports. The table on this chart shows the average precipitation for August, as compared with that of the present month. Departures exceeding one inch from the normal precipitation are as follows: Missouri valley about 1.20 excess; Lower Lake region 1.70 excess; Florida Peninsular 4.03 excess; the Gulf States about 1.25 deficiency; St. Lawrence valley about 1.25 deficiency. In Oregon and the extreme southern part of California slight deficiencies are reported, while in northern and central California no rain has fallen. The great excess in the Florida peninsula resulted from the cyclone of August 29th. As shown below a most unusual number of heavy rains occurred during the month.

Special Heavy Rains.—1st, Corning, Mo., 1.70 inches in 1 hour, 50 minutes; Jacksonville, 3.30 in. in 8 hrs.; Pierce City, Mo., 2.50 in. 2nd and 3rd, Laredo, Tex., 3.18 in. in less than 6 hrs.; Cincinnati, 2.95 in. in 24 hrs.; Wellsboro, Pa., 3.92 in. 3rd, Highland, N. C., 2 in.; New Orleans, 1.17 in. in 50 min.; Fort Barrancas, Fla., 4.08 in. in 18 hrs. 3rd to 5th, Charlotte, N. C., 6.57 in. in 48 hrs. 3rd and 4th, Ellsworth, N. C., 13.00 in., of which 9.00 in. fell in 3½ hrs.; Cape May, 2.95 in. in 24 hrs.; Brookhaven, N. Y., 4.16. 4th, New London, 1.32 in. in 8 hrs.; Mystic, Conn., 2.10 in.; Fort Adams, R. I., 3.10 in.; Fortress Monroe, Va., 2.06 in. 4th to 6th, Cape Henry, 5.16 in. in 48 hrs.; Norfolk, 7.20 in., of which 2.15 in. fell in 8 hrs.; Chincoteague, 5.84 in., of which 2.05 in. fell in 8 hrs. 4th to 7th, Weldon, N. C., 6.68 in. 4th and 5th, Fall River, Mass., 2.95 in. in 17 hrs.; Somerset, 2.57 in., of which 2.00 in., fell in 1 hr. 10 min.; Fall River, 2.25 in. in 28 hrs.; Vine-land, N. J., 2.85 in. in 21 hrs.; Dover Mines, Va., 2.15 in. in 25 hrs. 30 min.; Johnstown, Va., 2.08 in., in 44 hrs.; New Bedford, Mass., 3.20 in. in 25 hrs. 30 min.; Newport, R. I., 3.57 in. in 24 hrs.; Barnegat, 2.41 in. in 24 hrs. 5th, Highland, N. C., 2.85 in.; Kittyhawk, 2.40 in. 5th and 6th, Cedar Keys, Fla., 5.38 in., of which 4.06 in. fell in 16 hrs. 6th, Fortress Monroe, Va., 3.75 in. Thomasville, Ga., 2.04 in. in 5 hrs. 40 min. 8th, Fayette, Miss., 2.60 in. in 6 hrs. 30 min.; Rio Grande City, Texas, 1.81 in. in 8 hrs. 9th, Point Pleasant, La., 2.00 in.; Fort Scott, Kan., 2.62 in. in 10 hrs. 10th, White Plains, N. Y., 1.80 in. in 1 hr. 30 min.; Fort Barrancas, Fla., 2.64 in. 11th, Wellsboro, Pa., 1.60 in. in 30 min.; Wilmington, 2.02 in. in 8 hrs., South Orange, N. J., 2.10 in. in